Safety Data Sheet

Reference No. 1039

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1. Chemical product and company identification

Product name WATER it Test Kit Sulfide (Hydrogen sulfide) Model WA-S

Company name OPTEX CO.,LTD.
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Section Quality Control Dept.

Recommended uses and restrictions Reagent for water quality measurement

2. Hazards identification

[GHS Classification**]**

Physical hazards: Classification not possible (no data for GHS classification available)
Health hazards:
Acute toxicity Inhalation (Dusts/Mists): Category 4 (applicable only K-1 reagent)
Skin corrosion/irritation: Category 1 (applicable only K-1 reagent)
Serious eye damage/eye irritation: Category 1 (applicable only K-1 reagent)
Respiratory or skin sensitization: Category 1 (respiratory sensitization) (applicable only K-1 reagent)
Specific target organ toxicity (single exposure):
Category 2 (respiratory organs) (applicable only K-1 reagent)
Specific target organ toxicity (repeated exposure):
Category 2 (teeth, respiratory organs) (applicable only K-1 reagent)
For those health hazards not listed above are not classified or classification not possible (no data for GHS classification available)
Environmental hazards:
Hazards to the aquatic environment-Acute: Category 2 (applicable only K-1 reagent)
For those environmental hazards not listed above are classifications not possible (no data for GHS classification available)

[GHS labeling elements**]**

[Signal word**]**
Danger

[Hazard statements**]** (All statements are applicable only for K-1 reagent)
Toxic if inhaled.
Causes severe skin burns and eye damage.
Causes serious eye damage.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause damage to respiratory organs.
May cause damage to teeth and respiratory organs through prolonged or repeated exposure.
Toxic to aquatic life.

[Precautionary statements**]**
Keep out of reach of children and store in the cool, dry and dark place.
Carefully read instructions before use and do not use for other purposes.
Wear personal protective equipment if necessary.
Do not inhale reagents.

Wash contaminated clothing.
Wash hands thoroughly before and after handling.
Avoid release to the environment.

3. Composition/ information on ingredients

Discrimination of single substance or mixture: Mixture

Reagent name	K-1 reagent			K-2 reagent		
Chemical name	Hydrochloric acid	Ferric (III) chloride hexahydrate	Water	N,N-Diethyl-p-phenylenediamine sulfate	Extender	Polyethylene
Content	<10%	<10%	>80%	<0.1%	<10%	>89.9%
Chemical formula	HCl	$FeCl_3 \cdot 6H_2O$	H_2O	$(C_2H_5)_2NC_6H_4NH_2 \cdot H_2SO_4$	-	$(C_2H_4)n$
METI No. (reference number under CSCL in Japan)	(1)-215	(1)-213	-	(3)-243 (1)-430	-	(6)-1
CAS No.	7647-01-0	10025-77-1	7732-18-5	6283-63-2	-	9002-88-4

4. First-aid measures

If reagents or developed sample;
Enter in eyes: Immediately rinse eyes with water for more than 15 minutes followed by the treatment by an ophthalmologist.
Contact with skin: Immediately wash out contaminated site with plenty of water.
Enter into mouth: Immediately rinse mouth with plenty of water.
If any symptoms appear after above measures, immediately get medical advice or treatment.
Especially in case ingested reagents or developed sample, drink plenty of milk or water and immediately get medical advice or treatment.

5. Fire-fighting measures

Extinguishing methods: Cut off ignition sources and extinct by a suitable media.
Suitable extinguishing media: Water (mist), powder, carbon dioxide and dry sand.

6. Accidental release measures

In case of outdoor use: Avoid spill of reagents or waste solutions.
In case of indoor use: If spilled on a table or floor, wipe off immediately spilled reagents and dispose of them.
Concentrated solutions should not be released into sewer or rivers.

7. Handling and storage

Handling: Avoid eyes contact, skin contact, ingestion and inhalation of reagents.
pHs of K-1 reagent and a sample after the addition of reagent are <2. Similar attention is necessary.
Especially for outdoor use, ensure to bring back reagents, liquid waste after the measurement and used containers.
Storage: Avoid direct sunlight and store in a well-ventilated, cool, dry and dark place.

8. Exposure controls and personal protection

Administrative control level
Working environment standard: Not established

Occupational exposure limits

Japan Society for Occupational health: 5 ppm (7.5 mg/m^3) (only Hydrochloric acid)
OSHA(PEL): air Cl 5 ppm (only Hydrochloric acid)
ACGIH (TLVs): Cl 5 ppm (only Hydrochloric acid)
ACGIH (TLVs): TWA 1 mg (Fe)/m^3 (only Ferric (III) chloride hexahydrate)
Protective equipment: Recommend to wear protective glasses and gloves

9. Physical and chemical properties

Physical state: K-1: Liquid reagent 6 mL x 1 plastic bottle in a plastic bag
K-2: Tube containing powder reagent
1.1 g x 40 tubes/kit (5 tubes per one aluminum laminated packaging)
Color: K-1: yellow (liquid), K-2: white (powder), semi-transparent (polyethylene tube)
Odor: K-1: no odor, K-2: no odor
pH: $\leq$ 1 (K-1 reagent, developed sample)

Melting point, boiling point, flash point, ignition point, lower explosion limit, vapor pressure, density, relative density, solubility, Pow, kinetic viscosity: not available as a mixture

10. Stability and reactivity

Avoid leaving in a place where high temperature, humid or under direct sunlight. Stable under normal use conditions and no dangerous reactions under specific conditions are expected. No information on hazardous decomposition product is available.

11. Toxicological information

No data on mixture is available. Data on K-1and K-2 reagents are shown below.

K-1 reagent
Hydrochloric acid (gas) (no data on solution is available):
Acute toxicity:
Oral: Classified as Category 3 based on data; Rat: LD_{50} = 238 ~ 277, 700 mg/kg (SIDS (2002)).
Dermal: Not classified based on data; Rabbit $LD_{50} \geq$ 5,010 mg/kg (SIDS (2002)).
Inhalation (gas): Classified as Category 3 based on data; 1,411 ppm was obtained from statistical calculation of converted value of rats: LC_{50} = 4.2 mg/L, 4.7 mg/L, 238 mg/L/60 min (SIDS (2002)).
Inhalation (dust, mist): Classified as Category 2 based on data; Rat LC50 (aerosol) = 1.68 mg/L/1hr (SIDS (2002)) which is equivalent to 0.42 mg/L/4hr.
Skin corrosion/ irritation: Classified as Category 1A – 1C based on data; Rabbit: Corrosive to the skin by 1 – 4 hour exposure depending on concentrations (SIDS (2002)). Mouse, rat: Skin irritation and inflammation associated with changes of color by 5 – 30 minutes exposure (SIDS (2002)). Human: Mild to severe irritation, ulcer and skin burns (SIDS (2002)).
Serious eye damage/ eye irritation: Skin corrosion is classified as Category 1. Data of serious damage and eye irritation was obtained by exposure of hydrochloric acid solution.
Classified as Category 1 based on data; Causes serious eye irritation, damage and corrosion in multiple animal tests including rabbits (SIDS (2002)). It also reported that may cause persistent eye damage and blindness in humans (SIDS (2002)). It is classified as C, R34 in the EU classification
Respiratory or skin sensitization
Respiratory sensitization: Classified as Category 1 based on data; Japanese Society of Occupational and Environmental Allergy lists as an occupational sensitizer. It is reported that caused bronchial spasm after the exposure of cleaning product containing hydrochloric acid furthermore caused asthma by a limited irritation after one year of the incident. (ACGIH (2003)).
Skin sensitization: Not classified based on data; Negatives in a guinea pig maximization test and a mouse ear swelling tests (SIDS (2002)) and no positive case was found among 15 people applied after10 – 14 days of induction (SIDS (2002)).
Germ cell mutagenicity: Classification is not possible because; No in vivo test data. Result of Ames test is negative. Result of In vitro chromosomal aberration assay is false positives due to low pH.
Carcinogenicity: Not classified based on data; IARC Group 3 (1992), ACGIH A4 (2003). No evidence which indicates carcinogenicity, was reported in rats and mice studies (SIDS (2002)). Epidemiological studies are of negative regarding relationships between carcinogenicity and exposure of hydrochloric acid (IARC 54 (1992), PATTY 5th (2001)).
Reproductive toxicity: Classification is not possible because of data luck based on available data; No developmental effect was observed in rats and mice administered during pregnancy period.

Effects on reproduction or fertility are not known if exposed before mating or during early developmental stage.

Specific target organ toxicity (single exposure): Classified as Category 1 (respiratory organs) based on animal and human data; Following effects in humans are reported by inhalation exposure; breathing difficulty, inflammation of pharynx, bronchitis, bronchoconstriction, pneumonia, effects on upper airways such as edema, inflammation and necrosis and lung edema (DFGOT vol.6 (1994), PATTY 5th (2001), IARC 54 (1992), ACGIH (2003)).

In animal test also reported that toxicological and morphological effects in lungs and bronchial tubes were observed e.g. bronchitis associated with necrosis of mucous membranes, lung edema, bleeding and thrombus (ACGIH (2003), SIDS (2002)).

Specific target organ toxicity (repeated exposure): Classified as Category 1 (teeth and respiratory organs) based on data; Damages of teeth by diabrosis in multiple cases are reported in human repeated exposure (SIDS (2002), EHC 21 (1982), DFGOT vol.6 (1994), PATTY 5th (2001),). It is also reported that increased incidence of chronic bronchitis (DFGOT vol.6 (1994)).

Aspiration Hazard: Hydrochloric acid is gas state in GHS definition.

Ferric (III) chloride hexahydrate

Data: Not available

Water:

Acute toxicity:

Oral: Rat LD_{50} > 90 ml/kg

Other data: Not available.

K-2 reagent

N,N-Diethyl-p-phenylenediamine sulfate

Acute toxicity:

Oral: Rat LDL_0 100 mg/kg, trembling, convulsion, epilepsia, rigor (RTECS)
Mouse LDL_0 300 mg/kg, rigor, methemoglobinemia (RTECS)

Serious eye damage/ irritation: Rabbit Mild 500mg/24H (RTECS)

Other data: Not available

Polyethylene:

Acute toxicity:

Oral: Rat LD_{50} > 7,950 mg/kg (used 7,950 mg/kg for the calculation of ATEmix below)

Carcinogenicity: IARC Group 3 (not classifiable as to carcinogenicity to humans).

Other data: Not available

GHS classification results of K-1and K-2 reagents as mixtures are shown below.

[Acute toxicity (oral)]

K-1 reagent: Not classified based on application of the additive equation of LD_{50} (rat) values of each ingredient.

K-2 reagent: Not classified based on application of the additive equation of LD_{50} (rat) values of each ingredient.

[Acute toxicity (dermal)]

K-1 reagent: Not classified based on application of the additive equation of LD_{50} (rabbit) values of each ingredient.

[Acute toxicity (inhalation: gas)

K-1 reagent: Not applicable because it is a liquid.

[Acute toxicity (inhalation: dusts/mist)]

K-1 reagent: Classified as Category 4 (Warning, Toxic if inhaled.).Based on application of additive equation of LC_{50} (rat) values of ingredients.

[Skin corrosion/ irritation]

K-1 reagent: Classified as Category 1 (Danger, Causes severe skin burns and eye damage.) because it contains more than 5% of category 1.

[Serious eye damage/ eye irritation]

K-1 reagent: Classified as Category 1 (Danger, Causes serious eye damage.) because it contains more than 3% of category 1.

[Respiratory or skin sensitization]

K-1 reagent: Classified as Category 1 (Danger, May cause allergy or asthma symptoms or breathing difficulties if inhaled.) because it contains more than 1% of category 1 (respiratory sensitization).

[Specific target organ toxicity (single exposure)]

K-1 reagent: Classified as Category 2 (Warning, May cause damage to respiratory organs.) because it contains 1 to 10% of category 1.

[Specific target organ toxicity (repeated exposure)]

K-1 reagent: Classified as Category 2 (Warning, May cause damage to teeth and respiratory organs through prolonged or repeated exposure.) because it contains 1 to 10% of category 1.

K-1 and K-2 reagents: [Germ cell mutagenicity], [Carcinogenicity], [Reproductive toxicity], [Aspiration hazard] and;
K-2 reagent: [Skin corrosion/ irritation], [Serious eye damage/ eye irritation], [Respiratory or skin sensitization], [Specific target organ toxicity (single exposure)], [Specific target organ toxicity (repeated exposure)]
Classifications are not possible because of data lack.

12. Ecological information

No data on mixture is available. Data on K-1and K-2 reagents are shown below.

K-1 reagent
Hydrochloric acid:
Hazardous to aquatic environment- Acute: Classified as Category 1 based on data; Crustacea (*Daphnia magna*): 48-h EC_{50} = 0.492 mg/L (SIDS, 2005).
Hazardous to aquatic environment- Chronic: Not classified because it is considered that toxicity is manifested by acidity of solution however it should be lowered in the environment because of buffering effects
Other data: Not available.

Ferric (III) chloride hexahydrate: No eco-toxicological information is available.

K-2 reagent
N,N-Diethyl-p-phenylenediamine sulfate, Polyethylene: No eco-toxicological information is available.

GHS classifications as a mixture are shown below.
[Hazardous to aquatic environment- Acute]
K-1 reagent: Classified as Category 2 (Toxic to aquatic life.)
Based on the equation 1 (M=1) x 10 x less than 10% = 25 to 100%
K-2 reagent: Classification is not possible because of data lack.
[Hazardous to aquatic environment- Chronic]
K-1 and K-2 reagents: Classifications are not possible because of data lack.
[Harmful effects on the ozone layer]:
Every reagent: Classification is not possible because each of the substances is not described in Annex to Montreal Protocol.

13. Disposal considerations

pHs of remaining K-1 reagent and liquid waste after the measurement are $\leq$ 2. Liquid Waste contains ca. 2 mg of iron per measurement.
Always dispose according to local regulations.

14. Transport information

In addition to precautionary measures regarding handling and storage, avoid rough handling so as not to break containers. It is recommended to ship by air because under high temperature for long period may lead to deterioration.

UN classification and number:	3264
Proper shipping name:	Corrosive liquid, acidic, inorganic, n.o.s. (applicable only K-1 reagent)
UN classification:	Class 8 (Corrosives)
Packing group:	II
Civil Aeronautics Act:	Same as above. Applicable for Excepted Quantities of Dangerous Goods.
Poisonous and Deleterious Substances Control Act:	Not applicable (The product contains less than 10% of hydrochloric acid and not applicable as a deleterious substance)
Fire Service Act:	Not applicable
Total weight of the product:	ca.150 g/kit

15. Regulatory information

PRTR Act: Applicable
Ferric (III) chloride hexahydrate is applicable to the Class I Designated Chemical Substance listed in (71) of Appended Table 1:ferric chloride.

Industrial Safety and Health Act: Applicable
Hydrochloric acid is applicable to the Ordinance on Prevention of Hazards Due to Specified Chemical Substances, Group-3 Substances.
Hydrochloric acid and Ferric (III) chloride hexahydrate are applicable to the Chemical Substances of which names of substances shall be indicated listed in 634 of Appended Table 9 of the Cabinet Order set forth in Article 18-2 of the Act.

Waste Disposal and Cleaning Act: Applicable
Applicable to the Special Controlled Industrial Waste of the Act because pHs of remaining K-1 reagent and liquid waste after measurement are less than 2.

16. Other information

Reference literature

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Koukuu Kikenbutsu Yusou Houreisyu, Ed. MLIT, HOUBUN SHORIN CO., LTD. (2015)
JIS Z 7252:2014 Classification of chemicals based on “Globally Harmonized System of Classification and Labelling of Chemicals (GHS)” (Japanese Industrial Standards Committee)
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UN GHS (tentative translation, forth revised version), GHS Kankei Syocho Renraku Kaigi (2011)
Ministry of Economy, Trade and Industry, GHS Classification Guidance for Enterprises 2013 Revised Edition (2013)

NOTE) This information is not always exhaustive and use with care.
This data sheet only provides information but any description cannot be warranted.
Descriptions may possibly be changed because of new findings or modification of the current knowledge.
Precautions only cover normal handling.
This English SDS is prepared in the cooperation with the Chemicals Evaluation and Research Institute (CERI), Japan.